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A CONCEPT FOR THE CORPS OPERATIONS COMMAND COMPLEX IN THE 1980'--ETC(U)
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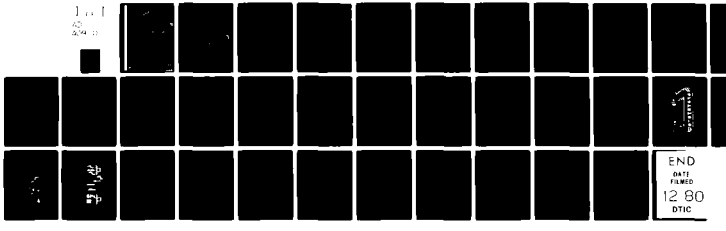

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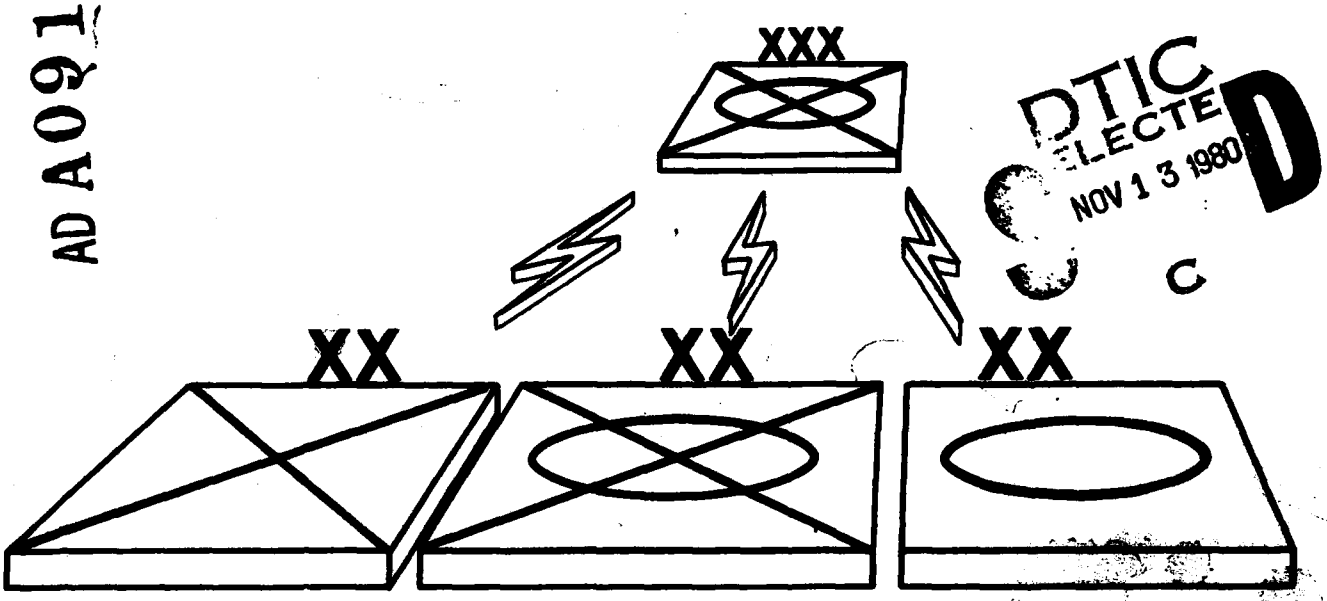

A Concept for the Corps Operations Command Complex in the 1980's

W. A. Tidwell

July 1976

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AB

FOREWORD

This paper was prepared for the Director of Battlefield Systems Integration in the U.S. Army Material Development and Readiness Command (DARCOM). It's purpose is to show how concepts for the operation of the Corps currently being developed by the Combined Arms Center of the Training and Doctrine Command (TRADOC) could be assisted and enhanced by judicious automation of information handling. The focus on information handling may cause the reader to feel that there is emphasis on Intelligence and a neglect of Operations. Nothing could be further from the intent of this paper. The stress is on operations as they could be assisted and improved by timely information.

Many people fear that automation would necessarily involve large, complex, and costly computer systems. This paper shows that if the decision-making process can be structured in a functional manner around the main missions of a headquarters, it might then be possible to format, codify, and filter the information from sensors, sensor systems, and other sources in such a way that the job might be done by one or more minicomputers–and possibly microprocessors. A large central computer is not necessarily the best solution for this type of automation.

This specific example of automated assistance to information handling and decision making involves the following principle features:

a. Identification of the main operational programs that the Commander wishes to pursue. (In this example we have used maneuver operations, various uses of fire power, and electronic warfare as the main foci of command interest.)

b. Forwarding of combat information in formatted messages to permit a data transmission system to handle several thousand reports per hour, each report showing the location, time, and classification of some possible enemy activity.

c. Display of all timely combat information in graphical fashion in the Corps and Division TOC's (This display of current activity would show the pattern of geographic distribution of enemy activity.).

d. Establishment of Action Teams in the TOC's–each with responsibility to assess the current enemy activity as it affects a particular operational responsibility and to recommend action that should be taken to carry out that responsibility.

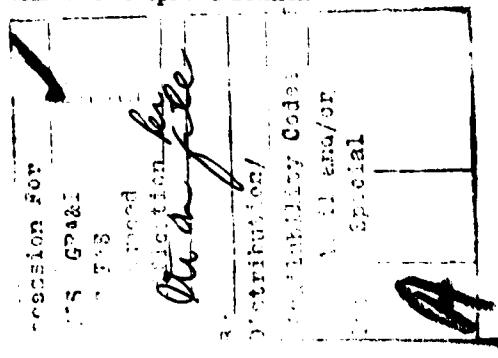
e. Action Teams to be directed by Controllers, each of whom would supervise one or more Action Teams (Each controller would have broad authority to release orders for certain types of operational actions.)

f. The TOC's would also be assisted by various additional displays–some prepared in the TOC, some by the EWI Operations Center, and some by other elements of the Corps staff (These displays might be reported to the Tactical CP as required.).

g. The Action Teams would have the capability of manipulating data on team or individual consoles, but decisions would be made by human beings.

h. All individuals involved in making plans and decisions and in issuing instructions would have essentially the same information about the battle.

i. The organization of Corps and Division TOC's would be roughly parallel, with logical differences according to the differing responsibilities of Corps and Division echelons.



In addition, it is anticipated that a future war will involve a target rich environment and that our Intelligence and Battlefield Surveillance Systems would detect and report thousands of these targets each hour. Serious concern has been expressed that humans would be overwhelmed by the volume of reports that could be provided to a headquarters by an automated system. This paper is based on the proposition that if information is presented graphically, it can be absorbed, analyzed, and understood by a human much more rapidly than information which is presented in textual form. In order to prevent being swamped by data, this paper proposes as one of the key features of the system a buffer in the form of a display which would show substantially all of the sensor returns reported to a Tactical Operations Center (TOC). These returns, correlated with sensor coverage, would form a geographic pattern of enemy activity. The more reports, the more complete would be the pattern, yet no single report would have to be acted on. The humans using the display would analyze the pattern, select the most critical parts, and work the most important targets at those points. The number of reports requiring work would be determined in part by the amount and importance of enemy activity and the number of staff officers available to work targets in priority order. All reports would contribute to pattern formation, even if they were not acted upon.

This concept is based on automation technology that appears to be feasible and relatively low risk, according to the present state-of-the-art. Final selection of a system would require detailed study and analyses of alternatives, which were not attempted in this paper. Nothing said here should be regarded as a firm, final solution to a problem. Instead, this is a concept to illustrate how a system might work to create a dynamic illustration that might be of use to those who must implement the new tactical and organizational ideas now being developed.

The main practical objection to the automation of data handling support to operations is that power failure or a breakdown in the computer system could leave a staff almost helpless, without displays and with no access to stored information. This is an important concern, but it may be possible to create an automated system that would avoid these problems. The concept described here could probably be implemented with a series of minicomputers instead of a large central processor. This, plus design for rapid substitution of component modules, should minimize the impact of failure of electronic components.

Power failure is another matter, but if the power supply to a TOC fails today, it is common practice to continue operations by the use of flashlights and battery powered lamps. In the same spirit it may be possible to design the computer equivalent of the flashlight. In other words, provision could be made for an emergency power supply in the system which would be adequate to print out the display and data base information in the case of a power failure. In such a situation the TOC could continue operations manually until the power could be restored. The system could also be designed to prevent the loss of stored programs and data so that it could begin operations again as soon as power was restored.

To help the reader understand the dynamics of the system outlined in this paper, Appendix A traces the path of a single item of combat information through the TOC's and shows the actions that resulted from that information.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

GLOSSARY

AA	– Anti-Aircraft
AD	– Air Defense
ADS	– Air Defense Suppression
ASA	– Army Security Agency
ATMS	– Air Traffic Management System
CEP	– Circular Error Probable
CI	– Counterintelligence
CP	– Command Post
CTOC	– Corps Tactical Operations Center
DARCOM	– U.S. Army Materiel Development & Readiness Command
DASC	– Direct Air Support Center
DCAC	– Division Control and Analysis Center
DIVTAC	– Division Tactical Command Post
DTOC	– Division Tactical Operations Center
ECCM	– Electronic Counter-Countermeasures
EEP	– Eliptical Error Probable
ELINT	– Electronics Intelligence
EW	– Electronic Warfare
EWI	– Electronic Warfare & Intelligence
FCAC	– Forward Control and Analysis Center
FEBA	– Forward edge of the battle area
FO	– Forward Observer
FSE	– Fire Support Element
HUMINT	– Human Intelligence
MAGIIC	– Mobile Army Ground Imagery Interpretation Center
MP	– Military Police
NBC	– Nuclear, Biological, & Chemical
NETS	– Network of Sensors (Unattended Ground Sensors and Ground Surveillance Radars)
OB	– Order of Battle
OPSEC	– Operational Security
PCAC	– Primary Control and Analysis Center
RPV	– Remotely Piloted Vehicle
SEAD	– Suppression of Enemy Air Defense
SHORAD	– Short Range Radar
SI	– Special Intelligence
SIGINT	– Signals Intelligence
SOTAS	– Stand-off Target Acquisition System
TACC	– Tactical Air Control Center
TACFIRE	– The network of computers which handles targets and firing data for Division Artillery
TACP	– Tactical Air Control Party
TAFIG	– Tactical Air Force Interoperability Group
TASE	– Tactical Air Support Element
TOC	– Tactical Operations Center
TRADOC	– U.S. Army Training & Doctrine Command
USAF	– United States Air Force

SUMMARY

Under the concept described in this paper the Corps will develop the broad concept of tactical operations, concentrating the forces to execute it, and monitoring and supporting its execution. The Corps will also work with the USAF to develop and execute the Army portion of:

- **Interdiction Program**—designed to inhibit enemy movement and destroy his forces before they reach the forward edge of the battle area (FEBA).
- **Air Defense Program**—designed to defeat enemy target acquisition and air attacks and to minimize damage resulting from air attack.
- **Electronic Warfare Program**—designed to exploit enemy electronic activity to learn what the enemy is doing or plans to do, to prevent the enemy from achieving his aims, and to assist friendly forces to achieve their aims.
- **Counterintelligence and Deception Program**—designed to minimize enemy access to information of friendly forces and to confuse or mislead him concerning friendly operations.
- **Air Defense Suppression Program**—designed to aid the deployment of USAF and Army aviation assets over enemy territory.

To carry out all of these activities, the Corps headquarters will operate the Electronic Warfare/Intelligence Operations Center (EWI) as the major Fusion Center in the Corps, designed to use information from all sources to produce the intelligence needed by the Corps and its Divisions in planning their operations. Information needed to monitor/conduct current maneuver operations and targeting will be shared by Corps and the Divisions concerned on a near real-time basis. Information sharing will be accomplished by a data exchange system which will supplement existing Command and Control Communications.

The Divisions will develop operational plans based on the Corps concept of maneuver, execute their portion of the Corps plan, and control the conduct of the battle. They will also normally execute that portion of the Corps Interdiction program within range of Division Artillery using Artillery or Army Aviation, or requesting Air strikes to engage targets developed in Zone II. Brigades normally will be responsible for using Artillery, Army Aviation, or Close Air Support strikes to engage targets in Zone I.

The Divisions will also be responsible for executing important portions of the Corps Programs for Air Defense, Electronic Warfare, Counter Intelligence and Deception, and Air Defense Suppression.

The Division Commander will control the Divisions' operation from a mobile Division Tactical Command Post (DIVTAC), operating well forward in the Division area. He will be supported by a Division Tactical Operations Center (DTOC), also referred to as the Division Main Command Post or (CP), located out of range of enemy direct support artillery, which will keep him informed of the current situation affecting the Division. The DTOC will also manage the Divisions' portion of the Interdiction, Air Defense, Electronic Warfare, Counter Intelligence and Deception, and Air Defense Suppression Programs. Logistic support for the Division will be managed by the G-1 and G-4 sections in the Division Rear Command Post, located in the rear of the Division operating area. Division Rear will keep the DIVTAC and the DTOC informed of critical logistics matters.

One of the main functions of the DTOC will be to recognize information needed by subordinate units and to take positive action to

see that the information is delivered to all echelons that require it.

The following discussion describes the organization, functions, information displays, and information needs of the main elements in the Corps Command Complex.

THE CORPS OPERATIONS COMPLEX

The Operations complex of a Corps and its subordinate Divisions will be comprised of the following major elements:

At Corps (Commands maneuvers) (Fig. 1):
- TOC
- G-3 Plans and Operations
- Electronic Warfare/Intelligence (EWI) Operations Center
- Direct Air Support Center (DASC)

At Each Division (Controls maneuvers) (Fig. 2):
- Tactical CP or Division Forward
- TOC (Division Main)
- G-3 Plans and Operations
- EWI Operations Center
- G-1 and G-4 or Division Rear

Other supporting elements such as Headquarters Companies, Signal units, and Military Police (MP) units are assumed to be present as required but are not included in the following discussion.

THE THREAT

The threat opposed by the Corps will include well trained troops organized into highly mobile armored or mechanized units prepared to fight in a nuclear, biological, and chemical (NBC) environment if necessary, supported by powerful artillery and missile forces, and protected by a complex, sophisticated Air Defense System. This threat force will be associated with an Air Force capable of contesting air superiority, performing electronic and photographic reconnaissance, and attacking both stationary and mobile targets in the U.S. Corps and Division areas. The threat force will also be capable of performing sophisticated electronic intelligence and electronic warfare and integrating these activities into his combat operations.

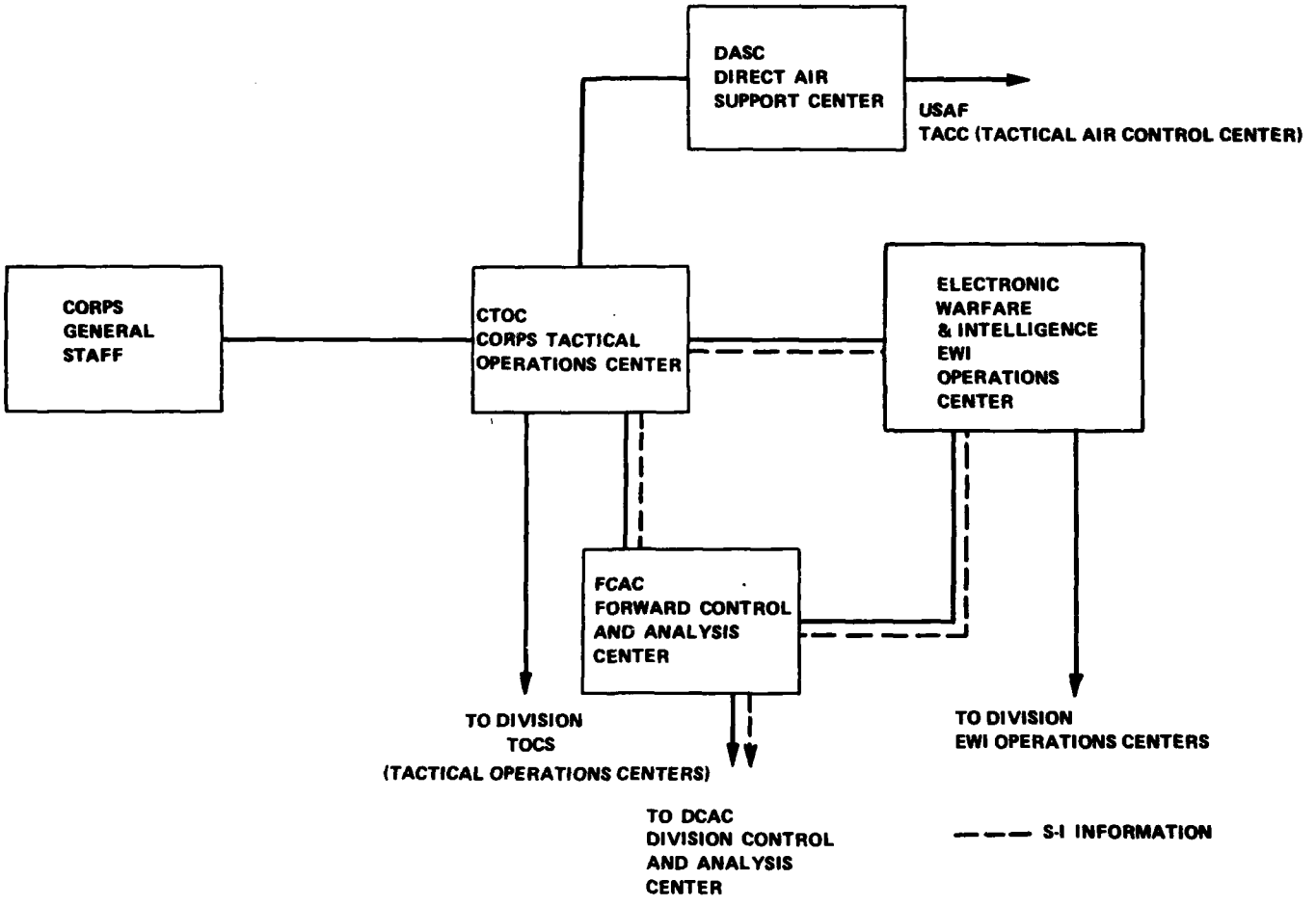


FIGURE 1
THE CORPS COMMAND COMPLEX

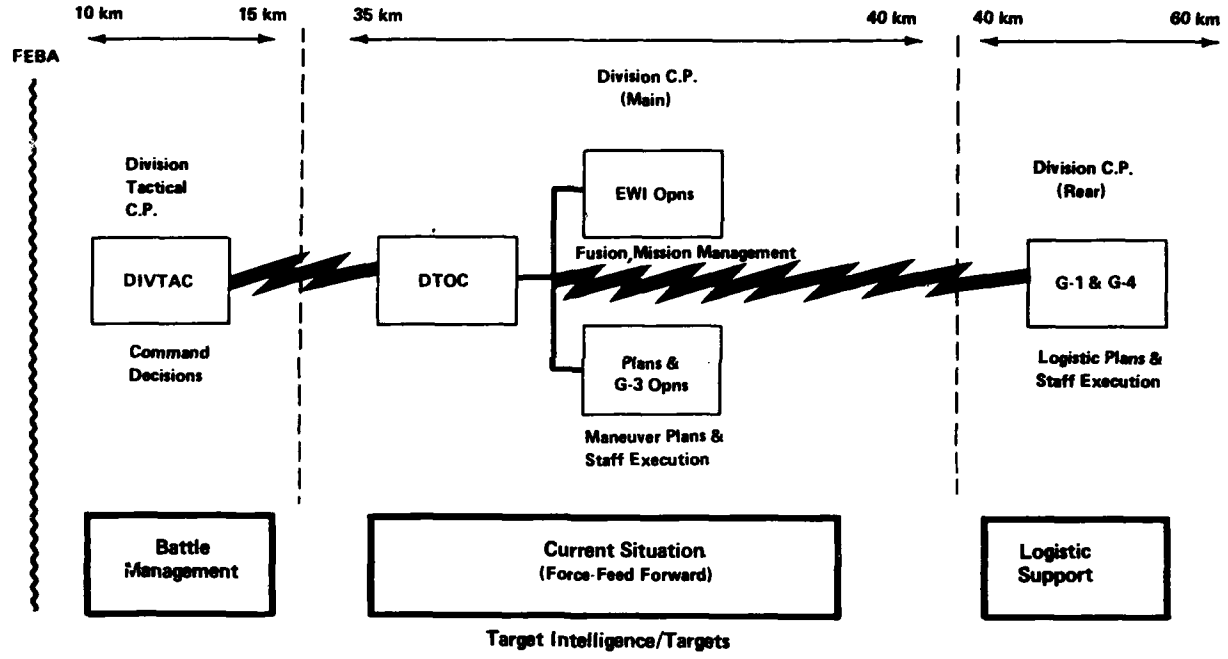


FIGURE 2
DIVISION COMMAND COMPLEX

INTELLIGENCE SUPPORT

To keep track of enemy activities and to provide targets for friendly weapons, a U.S. Corps will be supported by an Intelligence and Target Acquisition System capable of providing large volumes of information day or night, in most weather conditions, and in near real-time. (Figure 3). The average volume of this information may be on the order of 100 potential targets per minute per U.S. Division in the Corps, but if the enemy is inactive, the number will be less; if the enemy is very active, the number might be several times as great. However, it should be noted that most combat information can be processed and displayed graphically using less space than textual combat information.

COMMUNICATIONS SUPPORT

Since the Corps TOC, the Corps EWI, Division TOC and Division EWI will receive and use essentially the same information, the burden on communications could be great. Most of the data exchanged, however, would be formatted to minimize the load, and it is assumed that the Corps would be supported by a data distribution system in addition to its normal Command and Control Communications method.

This data distribution system is essential to the implementation of this concept.

THE CORPS TOC AND THE CORPS FUSION CENTER

The Corps will be responsible for developing the broad concept of tactical operations for the Corps, concentrating the forces to execute the concept, and for monitoring and supporting its execution, *i.e.*, the Corps will command a maneuver and the Division will control it.

The Corps will have primary responsibility for developing and conducting an Interdiction program designed to destroy or neutralize enemy forces before they enter the area of interest of the front line divisions. This program will be coordinated with the Interdiction Program conducted by the USAF. It will be based on indirect fire weapons under Corps control and strikes conducted by the USAF against targets nominated by the Corps. In addition, the Corps will be responsible for cooperating with the USAF in the conduct of the overall Air Defense program and an Electronic Warfare program designed to support ground force operations and the suppression of enemy air defense. The Corps will support the above operations by a Counterintelligence and Deception program designed to minimize enemy access to information on friendly forces and to confuse or mislead him concerning friendly operations. In order to carry out all of these activities, the Corps will operate the EWI Operations Center as the major Fusion Center in the Corps designed to use information from all sources, including information supplied by higher and lower headquarters and the National Intelligence Community. The product will be a composite of the intelligence required by the Corps and its Divisions in planning their operations. The combat information needed to monitor/conduct current maneuver operations and to target will be shared by Corps and the Divisions concerned on a near real-time basis. A concept for the internal organization of a Corps Tactical Operations Center is shown in Figure 4.

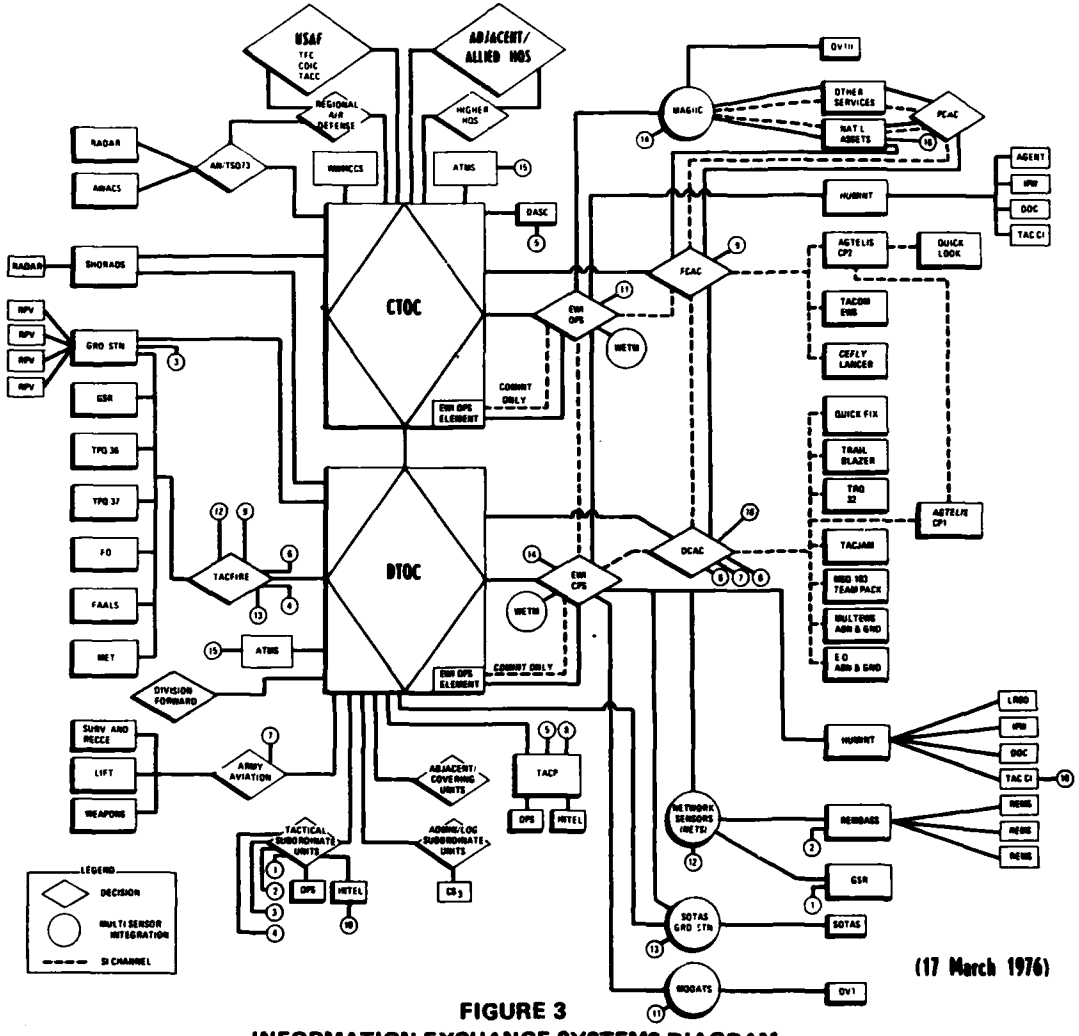


FIGURE 3
INFORMATION EXCHANGE SYSTEMS DIAGRAM

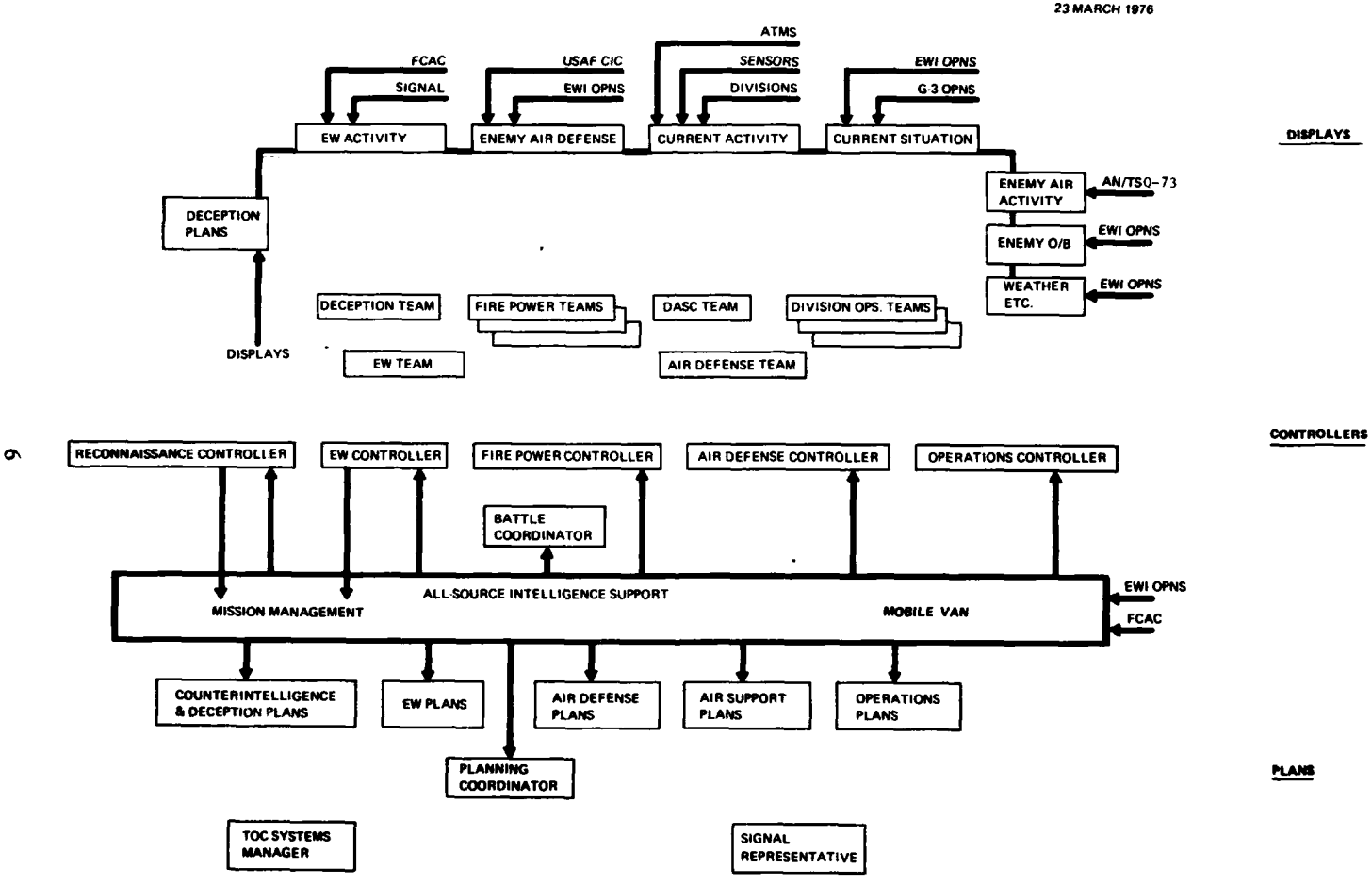


FIGURE 4
CTOC CONCEPT

THE CORPS TOC: ORGANIZATION

The Corps TOC will be organized into the following categories:

- Nine computer controlled displays
- Six functional action groups (teams)
- Controllers and a Battle Coordinator who direct the activities of the Action Teams
- All-Source Intelligence Support
- Planning Teams and a Planning Coordinator

Displays

The Corps TOC will be focused on a series of computer controlled displays designed to provide the information needed by the Corps Commander and the TOC staff in carrying out the main combat responsibilities of the Corps. Displays will be presented so that all elements of the TOC are operating on the basis of the most timely information available.

The displays will be used by the Corps to achieve the following goals:

- Develop the concept of maneuver for the Corps and monitor its execution.
- Develop a Deception and Counterintelligence Program designed to give the enemy the desired concept of our posture and to protect our actual posture from discovery.
- Cooperate with the USAF in the development and conduct of an Interdiction campaign against enemy forces in Zones II and III.
- Cooperate with the USAF in the development and conduct of the overall Air Defense (AD) Program, an Air Defense Suppression Program coordinated with both air and ground operations, and an Electronic Warfare Program designed to provide information on enemy plans and activities, interfere with the enemy's ability to attain his objectives, and support U.S. Ground and Air Forces in the achievement of friendly objectives.

The nine computer controlled displays used by the Staff of the Corps TOC are:

- Current Activity
- Current Situation
- Electronic Warfare
- Enemy Air Defense
- Enemy Order-of-Battle
- General Purpose Intelligence (weather, etc.)
- Resources
- Future Plans
- Counterintelligence and Deception Plan

These displays may be manipulated by selected members of the TOC and some or all of the information from them may be shown or manipulated on individual consoles for special purposes by members of the staff.

Current Activity Display

This display will show, in analog and in near real time, the location of each event detected by each sensor that fits predetermined criteria of location accuracy and timeliness. This display will provide information to show the broad pattern of current enemy activity and will permit the TOC to monitor the productivity of friendly sensor systems deployment. It

will also provide information to be combined with terrain information in the development of targets. Some targets may be revealed by direct evidence of sensors but others must be inferred by combining the output of sensors in the proper terrain context.

As discussed below, one of the primary responsibilites of the Divisions in the Corps will be to develop targets within range of friendly artillery and to allocate fire missions against them or request air strikes as appropriate. The Divisions, of course, may request air strikes on targets beyond artillery range if such targets are identified and appear to be critical to the Division's mission.

The primary responsibility of the Corps will be to develop an Interdiction program against enemy forces in Zones II and III and to focus on targets beyond the range of Division Artillery. The Corps will employ its weapons against these targets or request their engagement by the USAF. The Corps, of course, may also request the Divisions or the USAF to engage targets within artillery range if the targets appear critical and have not been detected by the Division.

Current Situation Display

This display of evaluated intelligence and friendly operational data will show the location of identified and estimated enemy units, the last reported location of friendly units, the boundaries between friendly units, and the boundaries or axes of advance for enemy units to the extent that they are known. This will be the main display at the Corps TOC, compiled from data submitted by the Divisions in near real-time and amplified and amended by the Corps EWI Operations Center. The locations of Corps units other than Divisions will be supplied by the Corps G-3. This display should permit a limited amount of replay in compressed time to illustrate the dynamics of the battlefield.

Electronic Warfare Display

This display will show the location of all important friendly electronic emitters, the location of all appropriate hostile emitters in the Corps area of interest, all friendly and hostile jamming activity, and all spoofing or other significant EW activitiy. It will show the location of all friendly receivers that are encountering hostile jamming or other serious interferences and the location and identity of all friendly emitters that are guilty of violations of Standard Operating Instructions.

The display will also show essential elements of the Corps/USAF EW plan–in the form of an annotated sketch-map or as alphanumerics. The information on the EW Display will be prepared by the EWI Operations Center and Corps Signal Intelligence units and entered in the display via remote input devices.

Enemy Air Defense Display

This display will show all known elements of the Enemy Air Defense system affecting the Corps' area of interest. It will also show all evidence of enemy AD activity to include appropriate Electronic Intelligence (ELINT) information and reports of the engagement of friendly aircraft. The Corps EWI Operations Center and the Direct Air Support Center (DASC) will be responsible for maintaining this display via remote input devices.

Enemy Air Activity Display

This display will repeat information from the Air Defense System showing those areas in the Corps area of interest on both sides of the FEBA where enemy air reconnaissance and air attacks are most frequent.

Enemy Order-of-Battle Display

This alphanumeric display will list identified and estimated enemy units in the Corps area of interest together with any significant data about each unit. This display will provide background data for the staff of the Corps TOC

to use in evaluating the significance of enemy activity, in estimating enemy intentions, and in recommending appropriate courses of action for friendly forces. The inputs to this display will be prepared by the Corps EWI Operations Center and it will be that organization's responsibility to keep the display up-to-date via a remote input device in the EWI Operations Center.

General Purpose Intelligence Display

This display will present pertinent terrain, trafficability, weather, and other data as the need may arise. In some cases, the data will be called up by officers in the TOC. In other cases, the EWI Operations Center may decide that the information is pertinent to current operations and will enter the material to the display on its own initiative. The purpose of this display will be to provide useful intelligence information to the TOC, and may include the results of studies and analyses as well as factual compilations. One useful feature might be to present an analysis of how well the current situation fits various templates of enemy activity. The text of these presentations will have varied format and will remain on display for varying lengths of time—all in accordance with the requirements of the current situation.

Resources Display

This display will show the current status of a few significant items concerning friendly forces. These items might include unit strengths, supply levels for Classes I, III, and V, casualties, and replacements. The inputs for this display will be prepared by G-1 and G-4 or by appropriate elements of the Corps Support Command.

Future Plans Display

The purpose of this display will be to show significant aspects of upcoming operations that the TOC staff needs to know in the conduct of current operations. Inputs to the display might be a map or alphanumerics and will be prepared by the G-3 Operations Planning Team for entry via a remote terminal.

Counterintelligence and Deception Plan Display

This display will show the various measures being taken to deceive the enemy and will show the friendly posture that we are trying to convey to the enemy. It should be located close to the *EW Status* display because many of the deception measures employed will probably be electronic measures, but the deception display itself should be clearly distinct from the other displays in the TOC to discourage the inadvertent use of deception data as if it were part of the real situation. The Counterintelligence Deception Team in the TOC will be responsible for preparing this display and keeping it up-to-date.

Corps TOC Staff: Organization

The displays described above will be used by the staff of the TOC who will be organized into specific functional and substantive groups. The main functional categories will be:

- Action teams
- Controllers (who direct the Action Teams)
- The Battle Coordinator
- All Source Intelligence Team
- Planning Teams
- The Planning Coordinator

In addition to these functional categories, the TOC will also contain a TOC systems manager responsible for keeping the display, computer, and communications systems operational. He will have maintenance crews which, to the extent possible, will work on the TOC systems from outside the TOC.

Action Teams

The Action Category will be further subdivided into teams on a substantive basis. Al-

though called "teams" because of the spread of expertise that each requires, a team may be one or more persons as required. Initially these teams will be:

EW Team

This team will communicate directly with the Forward Control and Analysis Center and Corps Signal units and will consult with the other Action Teams. On the basis of these consultations and the team's analysis of the information available to it, the Team will recommend friendly action against specific enemy electronic activities. In some cases, the team will recommend that they be engaged by friendly fire power; in other cases, it will recommend electronic measures. The team will have the capability to manipulate the EW Status Display as required.

Deception Team

This team will coordinate deception activities undertaken under the Corps CI and Deception Program. It will consult directly with the EW, Fire Power, and Division Operations Teams and on the basis of these consultations will recommend changes to deception plans and activities as required. The team will make inputs to the Deception display in coordination with the Deception Planning Team (see below).

Fire Power Target Teams

The number of teams may vary, depending on the size of the Corps area of interest, the volume of enemy activity detected, and the extent to which the Corps Commander wished to emphasize the Interdiction program. The mission of each team will be to identify enemy targets that may be inferred by a correlation of real-time information with terrain information and other immediately available information from the EWI data base. Once targets have been identified, the team will be responsible for recommending that the targets be engaged by a Division, by a Corps weapons system, or by the USAF. In the course of their work, the teams will communicate directly with the Division Operations Teams (see below), the DASC team, or Corps missile units, as appropriate. The teams will have the ability to display the appropriate terrain in three dimensions, call upon the EWI data base for data relating to the same area, and replay portions of the *Current Activity* display as needed. They will also coordinate their work with the other Action teams as appropriate.

The DASC (or TASE) Team

The DASC [or Tactical Air Support Element (TASE)] Team will communicate directly with the TACC, the Air Defense organization, and the Air Traffic Management System. It will monitor the operations and status of USAF units, keep the TACC informed of the current situation, and request Air Strikes against Corps targets. It will also work with other action teams to arrange necessary combat support and coordination for USAF operations including the suppression of enemy Air Defense. The team will have the capability to manipulate the Current Activity display or call on EWI operations for special displays as required.

Division Operations Teams

The number of these teams may vary with the number of attached units, but normally three teams should be able to monitor the activities of the Corps' Divisions and other organic and attached ground units. These teams will communicate directly with all subordinate and cooperating units and will monitor the current status of friendly units. They will keep all units fully informed of the current situation as it pertains to each of them. They must use initiative to "force feed" intelligence to all appropriate subordinate units. They will work with other action teams to arrange necessary combat support and will recommend instructions to subordinate units concerning future actions. Each team will have the capability to manipulate the Current Activity and Current Situation Displays and to call on EWI Operations for special displays as required.

Air Defense Teams

This team will communicate directly with both Air Force and Army Air Defense headquarters and with the CPs of all units subordinate to the Corps. The team will monitor the Air Defense situation, but will not control actual Army Air Defense fire missions. It will keep other action teams informed of Air Defense matters that might affect their responsibilities, monitor defense measures taken by troop units, and recommended further actions that should be taken by Corps units not directly involved in Air Defense.

Controllers

The Controller Category initially will be comprised of four controllers and a Battle Coordinator. Their job is to direct the work of the Action Teams and to manage those operations for which the TOC is responsible.

EW and Deception Controller

This officer will communicate directly with Corps G-3 Operations, the FCAC, and the TOC of subordinate Divisions. He will monitor the current situation, confer with the Battle Coordinator and other Controllers, guide the work of the EW Target Team and the Deception Team, and approve and issue instructions to subordinate units for the implementation of EW and Deception activities.

Fire Power Controller

This officer will communicate directly with G-3 Operations, the DASC, and the Division TOCS. He will monitor the current situation, confer with the Battle Coordinator and other Controllers, guide the work of the Corps Fire Power Target Teams, monitor the status of weapons systems providing fire support to the Corps, and approve the selection of targets and their allocation to the USAF or to a specific Army weapons system.

Reconnaissance Controller

This officer will communicate directly with the Corps EWI Operations Center, the Corps EWI Mission Management Branch, the DASC, and higher headquarters. He will monitor the current situation and the development of plans for future operations, confer with the Battle Coordinator and other Controllers, and issue instructions and requirements for the collection of information from all sources to include the redeployment of sensor and information gathering systems. In issuing requirements, he will coordinate with the Corps EWI Operations Center to ensure that the needed information cannot be provided from data already available.

Operations Controller

This officer will monitor the current situation, confer with the Battle Coordinator and the other controllers, guide the work of the Division and Air Defense teams, and make recommendations to the Battle Coordinator concerning instructions to subordinate units for the implementation of ground and Air Defense-related operations as appropriate. In performing these duties he will communicate directly with higher headquarters, USAF units, the Division TOC, and with Corps G-3 operations as required.

The Battle Coordinator

A personal representative of the Corps Commander will act as the Battle Coordinator. This person will normally be a senior officer intimately familiar with the Corps Commander's policies, such as an Assistant Corps Commander, the Chief of Staff, the G-3, the G-2, or the Deputy G-3.

The Battle Coordinator will communicate directly with the Corps Commander, commanders of subordinate units, with the heads of the sections of the General Staff, and with the Division TOCS. He will monitor the current situation, and confer with the controllers and with the Planning coordinator concerning the conduct of the Battle and plans for future operations. He will make the decisions in accordance with the Commander's Policies to ensure that the Corps executes its mission.

All-Source Intelligence

The next category of positions covers those devoted to providing All-Source intelligence support to the Corps TOC. This concept calls for the All-Source-Intelligence support element to be in its own van, incorporated into the TOC so that the personnel can see the TOC displays and can communicate with appropriate members of the TOC staff when it is apparent that information in the van should be brought to bear on the current activities of the Corps. The All-Source support personnel are also readily available to respond to questions raised by the Battle Coordinator, the Controllers, and the Planning teams. In addition, they provide a secure channel for the transmission of instructions and orders relating to some EW and Deception measures.

The numbers of people in the All-Source Support element may vary, depending on the volume of material needed and available, but the element should be prepared to provide support in all the substantive areas in which the TOC is interested.

The Planning Coordinator

The officer will be responsible for recommending future operations to the Commander, and for ensuring that planning for future operations is logically related to current operations and reflects the most up-to-date knowledge of current developments. He will supervise the work of the various planning teams and maintain direct communication with the G-3 plans Branch, and with the EWI Operations Center. He will ensure that all Corps plans are coordinated to fulfill the concept adopted by the Corps Commander.

The Planning Teams

The final category of positions in the TOC is that of five Planning Teams. Initially the Planning Teams will include:

Operations Planning Team

This team will be responsible for seeing that Corps plans for maneuver, Fire Support, Interdiction, and Suppression of Enemy Air Defense (SEAD) are prepared in accordance with the Commander's concept. It will monitor the current situation and communicate directly with the Higher Headquarters, Division TOCS, the G-3 Plans Branch, and the EWI Operations Center. It will perform such planning and coordination as can be accomplished in the TOC and levy requirements for staff assistance on the G-3 Plans Branch as required. It will work directly with the other planning teams to ensure coordination with Air Defense, EW and Deception planning. The team will ensure that appropriate orders are prepared for implementation of plans.

Counterintelligence and Deception Planning Team

This team will monitor the current situation and the status of plans for the next operation. It will develop the Corps plan designed to assist the next operation by preventing enemy intelligence from operating successfully and by deceiving the enemy concerning the Corps' actual posture. These plans will cover both counterintelligence (CI), and measures for creative deception of the enemy. The team will levy requirements on the EWI Operations Center, the FCAC, the G-3 Plans Branch, and Division TOCS as appropriate. The team will recommend appropriate orders to be issued for implementation of the plan and will keep up-to-date the Deception Plan display in the TOC.

EW Planning Team

This team will monitor the current situation, the status of plans for the next operation, and the Corps Deception Plan. It will develop an EW plan that will help to implement both Corps Operations and the Deception Plan. The EW plan will also provide for the coordinated use of fire power against selected enemy electronic targets. The EW Planning Team will com-

municate directly with the FCAC, Corps Signal Units, Division TOCS, the Corps EWI Operations Center, and the G-3 Planning Branch. It will levy planning requirements on the FCAC and Corps Signal Units as needed.

Air Defense Planning Team

This team will monitor the current situation, activities of the Air Defense System, the status of plans for the next Corps Operation, and the Corps Deception and EW plans. It will prepare those elements of Corps plans involving camouflage and concealment, and similar measures to minimize the effects of enemy air attack. The team will communicate directly with Air Defense Headquarters, the Division TOCS, the Corps EWI Operation Center, and the G-3 Plans Branch. It will keep Air Defense Headquarters informed of the future needs of the Corps for Air Defense.

Air Support Planning Team

This team will plan jointly with the USAF for the provision of Air Force assets for Close Air Support, Interdiction, and Air Lift to support future operations of the Corps. It will coordinate its activities with the other planning teams and will communicate directly with the DASC, Air Force planning staffs, the Corps EWI Operation Center, the Corps Support Command, and the G-3 Plans Branch.

THE DIVISION COMMAND COMPLEX

As shown in Figure 2, the Division Command complex is made up of several elements, widely separated but connected to each other and the Corps by secure Command and Control Communications and a secure data distribution system. Many of the Division elements are similar to those at the Corps level. The language describing them will therefore seem to be somewhat repetitive, but there are also significant differences which may be reflected by a difference of only a few words in the description of the Division elements.

Division Tactical Command Post (DIVTAC)

Each Division Commander will be supported and accompanied by a Tactical CP or Division Forward comprised of a minimum number of operations, intelligence, and signal personnel in appropriate vehicles. Their mission will be to help the Commanding General control Division Operations. The Division Forward will be completely mobile and will present a *minimum signature* to enemy sensors. In addition to necessary command and control communications, the DIVTAC will contain a computer assisted display which repeats the Current Situation display from the DTOC (Figure 5). The DIVTAC will also have a display and printer to receive ad hoc information from the TOC including overlays or other graphic materials and to query the TOC for additional information. In addition, the DIVTAC will have an input device which will enable the Commander's staff to enter formatted information about the enemy into the Division's data distribution system if *they* are the first to perceive it.

DIVISION TACTICAL OPERATIONS CENTER (DTOC)

The primary support to the DIVTAC will be provided by the Division TOC (Division Main). The DTOC will be responsible for keeping the Commander and the Commanders of the Brigades and other combat units informed at all times concerning the Current Situation and such other events or activities as they may need to know. The DTOC must also be prepared to act for the Commander and his command element in the event that he becomes a casualty or is out of communications with the Division for any reason. In accordance with his policies, the DTOC will also act for the Division Commander in the employment of fire power (Air, Artillery and Army Aviation) in the conduct of the Division portion of the Corps EW program, and in the management of the Division's portion of the Corps Counterintelligence and Deception program. The DTOC will also carry out operational planning to implement the Commander's maneuver concepts. In this activity, the DTOC will in turn be supported by the Division G-3 Operations Branch, and the Division EWI Operations Center. The latter may in turn request additional support from the Corps EWI Operations Center. The DTOC must be sufficiently mobile to move as often as every two hours if necessary. It must also offer a minimum signature to enemy sensors. A concept for the internal organization of the DTOC is shown in Figure 6. An Artist's concept is shown in Figures 7 & 8. The letters A through G located on Figures 6, 7 and 8 indicate the following activities/people: A-Displays, B-Action Officers, C-Controllers, D-Battle Coordinator, E-All-Source Intelligence, F-Planners, and G-Planning Coordinator and TOC Systems Manager.

THE EMPLOYMENT OF FIRE POWER

Brigades and other subordinate units will have primary responsibility to identify targets and employ Direct Support Artillery to engage them, to request fire missions from General Support Artillery, or to request Close Support Air Strikes in Zone I (FEBA to about 3-5 kilometers). They may, of course, act against targets identified in Zone II (3-5 kilometers to 50 kilometers), but it will be the primary responsibility of the DTOC to manage the Divi-

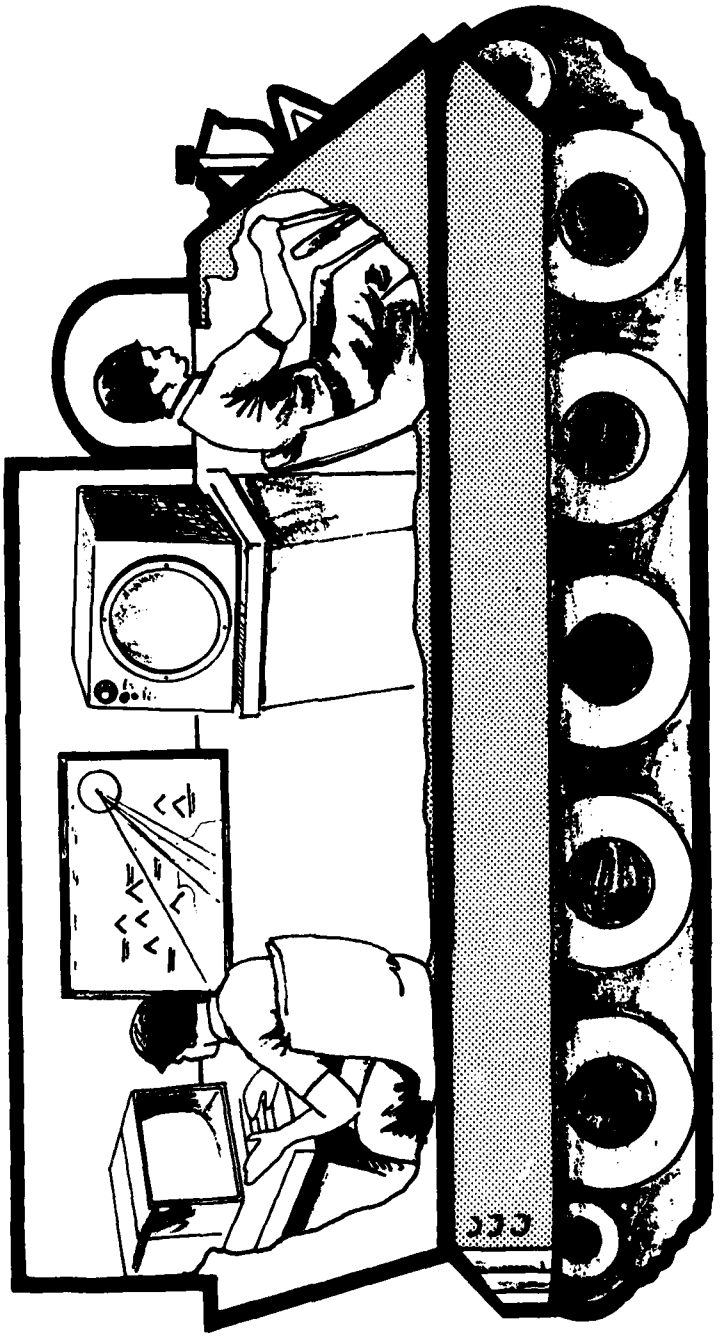


FIGURE 5
A DIVTAC VEHICLE

sion's portion of the Corps Interdiction program and the employment of combat power against targets in Zone II. In executing this responsibility, the DTOC will ensure that all potential targets identified by sensors that fit the Commanders' criteria will be passed immediately to the Division Artillery, to the Army Security Agency (ASA) Division Control and Analysis Center, to Army Aviation, and/or to the Tactical Air Control Party (TACP) for engagement by the appropriate weapons system.

Allocation of targets to weapons systems and the monitoring of responses by weapons systems under Division Control will be conducted by the DTOC Fire Power Controller and the Fire Power Teams. They will operate under the instruction, guidance, and priorities established by the Division Command and will be supervised by the Battle Coordinator at the DTOC level. This same information, plus all other current information that can be arranged by coordinate and time, will be brought to the Division TOC for presentation to the TOC staff in near real-time. This data would include reports of all moving vehicles, all electronic emitters located, all Forward Observers (FO) targets, and all observed, reported, or sensed activity regardless of source. The TOC will use this information to develop its synthesis of the current situation, to employ Division fire power or EW capabilities against targets that can be inferred from the sensor data (in addition to those that were identified explicitly by the sensors), and to direct the planning of future operations. The TOC will be organized so that the essential recommendations to the Commander and final staff coordination can be made within the TOC complex on the basis of a full knowledge of the current situation. In order to reduce the probability of physical destruction and damage all staff work that can be decentralized will take place in appropriate satellite installations, physically remote from the TOC, but connected by secure real-time communications. EW countermeasures must be employed to reduce the electronic signature of the DTOC.

Information Displays in the TOC

The focus of TOC activities will be a series of 10 interactive displays. The information for the displays will originate at diverse locations and the degree of interactivity with the TOC staff will vary according to need. These displays will be designed to permit evolution of the TOC and will accommodate information from new sources as they arise, handle increasing volumes of data, and treat new subjects as the need for them develops.

Current Activity

Current activity will be the main display in the TOC, and will show, in analog, the location of each event detected by each sensor or observer as it is reported. The primary purpose of the display is to show the pattern of enemy activity. Each item will remain on the display for a short time yet to be determined (2 minutes, 5 minutes or 15 minutes, for example) or for a length of time that may be adjusted by the staff of the TOC. Several positions in the TOC will have the capability to freeze the display (while storing incoming data) or to replay varying amounts of past display in compressed time. These and other positions will also have the capability to replay portions of the area of interest at their own stations without interfering with the main display

If possible, the display should use colors or different shaped symbols to identify classes of targets. The degree of refinement of the categorization would depend on the nature of the sensor information and the technical complexity required to show differentiation. As a minimum, electronic emitters, moving vehicles, and artillery positions should be distinguished from each other and these data sources further distinguished from other types of targets. The display should also indicate the Circular Error Probable (CEP) or Eliptical Error Probable (EEP) for the sensor return and each turn should fade or disappear after an appropriate amount of time.

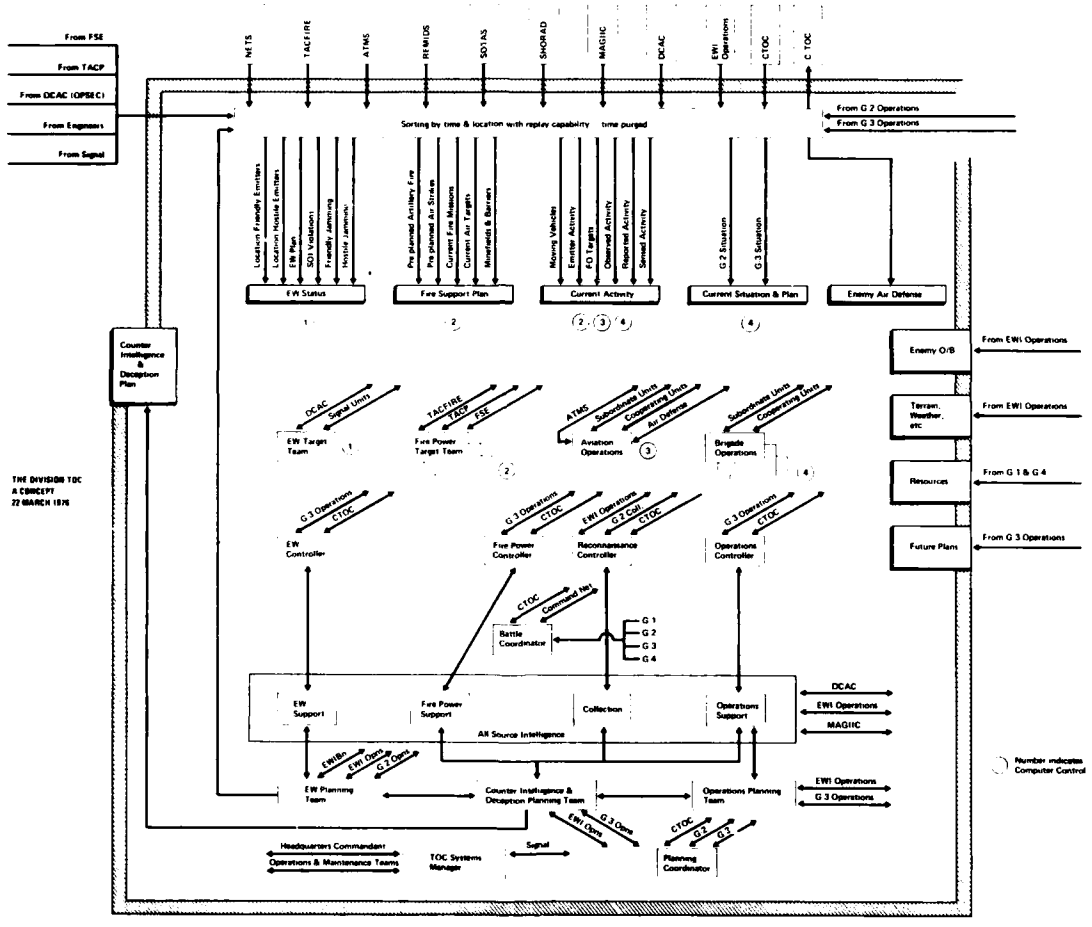


FIGURE 6
DETAILED DIVISION TOC CONCEPT

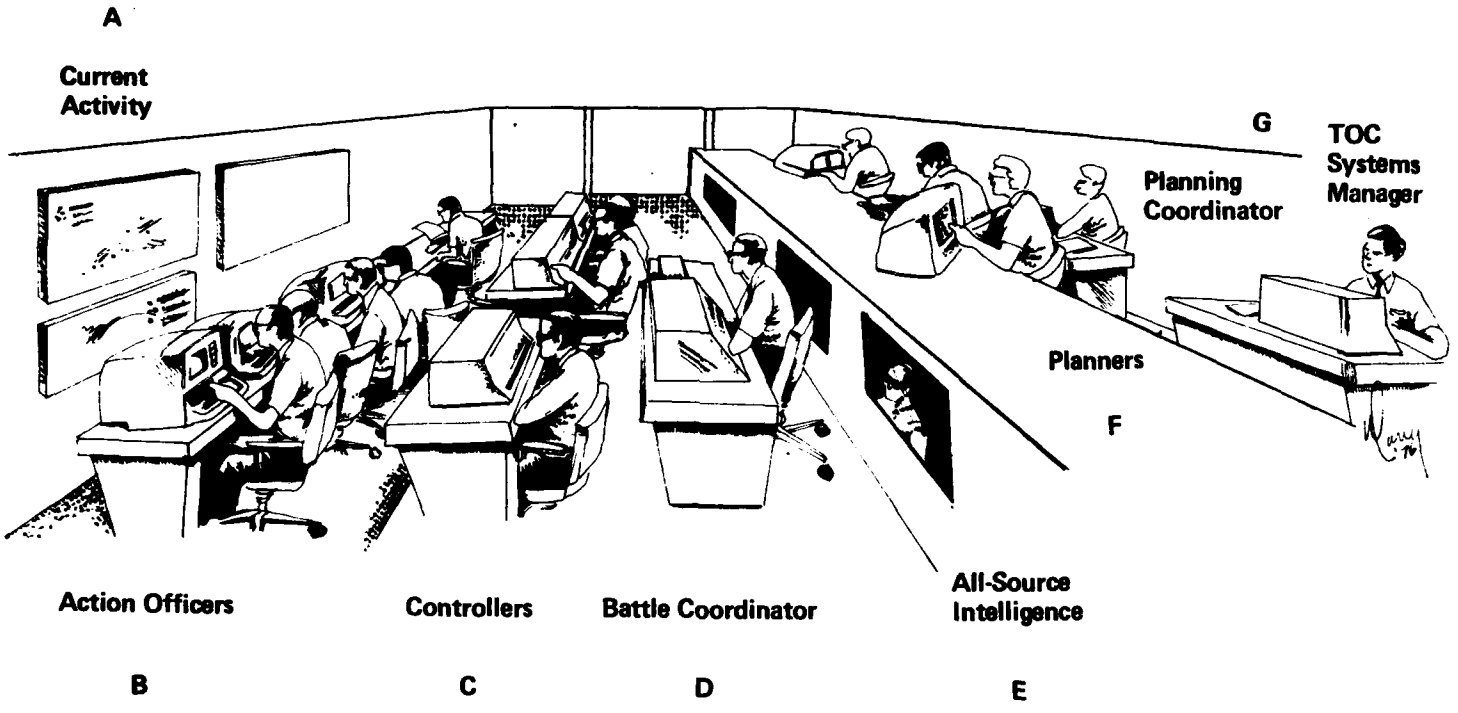


FIGURE 7
THE DTOC—A CONCEPT

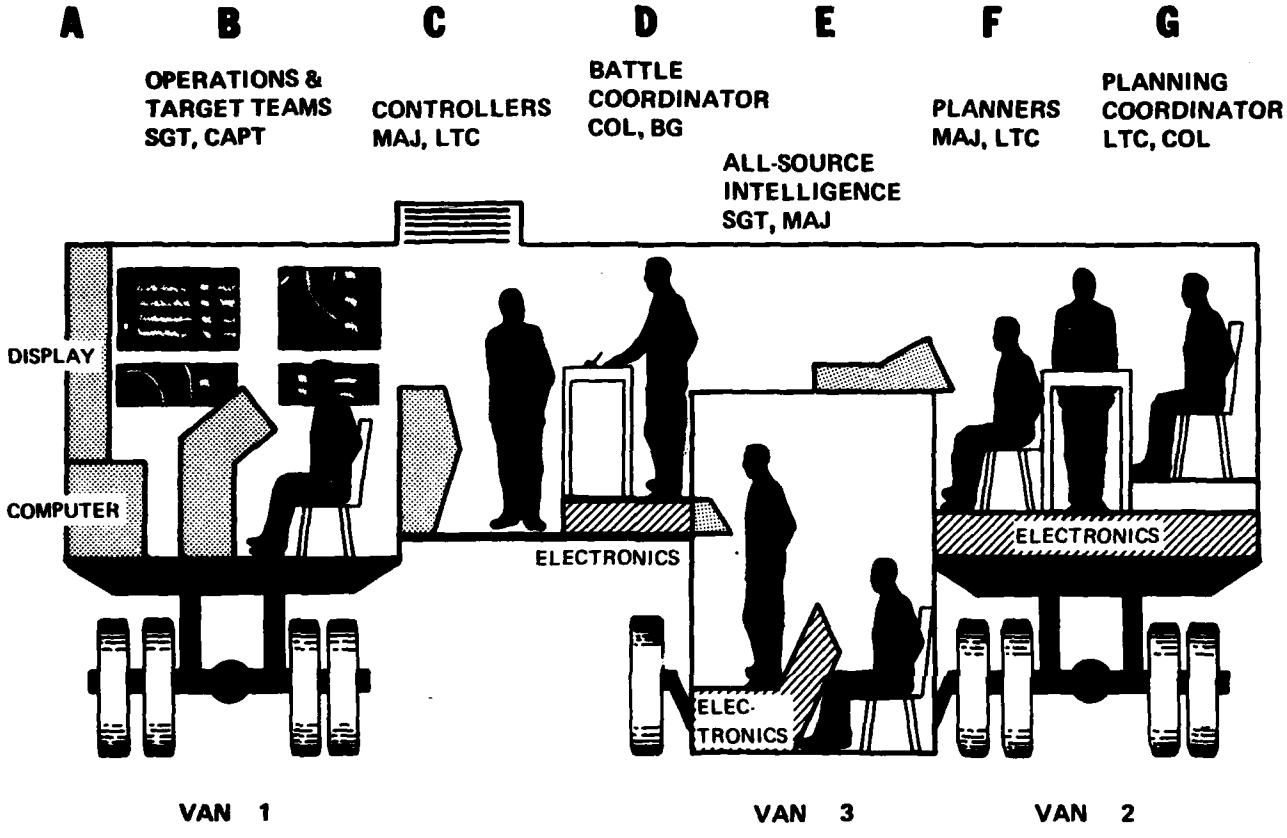


FIGURE 8
THE DIVISION TACTICAL OPERATIONS CENTER

The display should retain all data available for replay for a period of time to be determined by the DTOC staff. The length of time selected will be affected by the pace of combat expected. If the situation changes rapidly, there would be relatively little point in keeping data more than a few hours. On the other hand, in a slow moving situation it might be desirable to keep information for several days.

The Current Activity display should also be repeated in the EWI Operations Center where important items or patterns can be selected for retention in the EWI data base. It may also be necessary to repeat this display at the Corps TOC.

This display will have to handle an average of about 100 new targets per minute. Peak loads may double the number and many targets will be detected repeatedly over a period of time. The total display, therefore, may well have several thousand items on it at any one point in time. In peak situations, however, patterns will be obvious without retaining events on the display for the normal amount of time. It might be possible, therefore, to meet peak loads by reducing the amount of dwell time for each item, thus reducing the total burden on the display.

Current Situation

This display will be based on evaluated Intelligence and will show the location of identified and estimated enemy units, the last reported location of friendly units, the boundaries between friendly units, and the boundaries or axes of advance for enemy units to the extent that they are known. The EWI Operations Center will be responsible for preparing the inputs for the enemy portion of the display and keeping it continually up-to-date. The G-3 Operations Branch will be responsible for maintaining the friendly portion of the display in a similarly timely manner. The inputs for this display are comprised of evaluated information entered at remote terminals for display in the TOC. This display should also permit a limited amount of replay in condensed time and on occasion should be capable of replay in tandem with the Current Activity display. The Current Situation display will also be repeated in the DIVTAC to provide the Commander his primary view of the battlefield.

EW Status

This display will be the basic aide for the Division's electronic warfare campaign. It will show the location of all friendly electronic emitters of those classes that can be located readily, the location of all identified hostile emitters, all friendly and hostile jamming activity, and all spoofing or other significant EW activity. Most of the information will be sent to the DTOC by elements at the Corps level. The display will also show the location of all friendly receivers that are encountering hostile jamming or other serious interferences and the location and identity of all friendly emitters that are guilty of violations of Standard Operating Instructions. This last category will also be repeated in the Current Situation display to highlight for the Commander those units that have breached their own security.

The display will also show essential elements of the Division portion of the Corps EW plan or plans of higher units where appropriate. This may be accomplished in the form of an annotated sketch map or as alphanumerics.

This display will have to handle the location of numerous friendly emitters and numerous emitters per enemy division. If several enemy divisions are opposed to our division, the display must be capable of showing the location and activity of several thousand emitters in a short period of time. The burden on this display, like the Current Activity display, may be limited by limiting the length of time that the hostile emitter is displayed.

Fire Support

The display will show the preplanned Artillery Fires and Air Strikes, the Fire Support Coordination Line and any other line used to coordinate artillery fire and Air Force strikes, the location of mine fields and other barriers, and also will give the location of friendly artillery and missiles together with the areas of terrain within range of those weapons. It also will show the location of targets currently being engaged by Artillery or Air Strikes. The purpose of this display is to provide background for selecting the weapons system to be used in engaging newly identified targets.

Enemy Order-of-Battle

This alphanumeric display will list identified and estimated enemy units in the Division's area of interest together with any significant data about each unit. This display will provide background data for the staff of the TOC to use in evaluating the significance of enemy activity in estimating enemy intentions and in recommending appropriate courses of action for friendly forces. The display may be repeated to the DIVTAC on an ad hoc basis. The inputs to the display will be prepared by the EWI Operations Center which will be responsible for keeping the display up-to-date via a remote input device within the Center.

Enemy Air Defense

This display will show all known elements of the Enemy Air Defense system affecting the Divisions' area of interest and the locations at which friendly aircraft have been engaged recently. It will assist in planning operations of Army Aviation and in coordinating Close Air Support and Air Defense Suppression with the USAF.

General Purpose Intelligence

This display will present pertinent terrain, trafficability, weather, and other data as the need may arise. In some cases, the data will be requested by officers in the TOC. In other cases, the EWI Operations Center will decide that the information is pertinent to current operations and will enter the material to the display on its own initiative. The purpose of this display will be to provide useful intelligence information to the TOC. Data may include the results of studies and analyses as well as factual compilations. One useful feature might be to present an analysis of how well the current situation fits various templates of enemy activity. The text of these presentations will have varied format and will remain on display varying lengths of time—all in accordance with the requirements of the current situation. The contents of this display may be repeated to the DIVTAC on an ad hoc basis.

Resources

This display will show the current status of several significant items concerning friendly forces. These items might include unit strengths, supply levels of Classes I, III, and V, casualties, and replacements. The inputs for this display will be prepared by G-1 and G-4 or by appropriate elements of the Division Support Command. The contents of this display may be repeated to the DIVTAC on an ad hoc basis.

Future Plans

The purpose of this display will be to show significant aspects of upcoming operations that the TOC staff needs to know in the conduct of current operations. Inputs to the display might be a map or alphanumeric and will be prepared by the G-3 Plans Branch for entry via a remote terminal.

Counterintelligence and Deception Plan

This display will show the various measures being taken to deceive the enemy and will show the friendly posture that we are trying to convey to the enemy. It should be located close to the *EW Status* display because many of the deception measures employed will probably be electronic measures, but the deception display itself should be clearly distinct from the other displays in the TOC to discourage the inad-

vertent use of deception data as if it were part of the real situation. The Counterintelligence and Deception Planning team in the TOC will be responsible for preparing this display and keeping it up-to-date. Much of it will be based on information supplied by Corps.

THE TOC STAFF

The displays described above will be used by the staff of the TOC who will be organized into specific functional and substantive groups. The TOC Staff organization is largely a reiteration of the Corps TOC structure, with different communications responsibilities. The main functional categories will be:

Action teams
Controllers (who direct the Action Teams)
The Battle Coordinator
All-Source Intelligence Team
Planning Teams
The Planning Coordinator

In addition to these functional categories, the TOC will also contain a TOC systems manager responsible for keeping the various display, computer, and communications systems operational. He will have maintenance crews which, to the extent possible, will work on the TOC systems from outside the TOC.

Action Teams

The Action Categories will be further subdivided into teams on a substantive basis. Although called "teams" because of the spread of expertise that each requires, a team may be a single person, or more than one as the need may indicate. Initially, nine teams will operate as follows:

EW Target Team

This team will communicate directly with the Division Control and Analysis Center (DCAC) and Division Signal units and will consult with the Fire Power Teams and the other Action Teams as appropriate. On the basis of these consultations and the team's analysis of available information, the team will recommend friendly action against specific enemy electronic activities. In some cases, the team will recommend that they be engaged by friendly fire power; in other cases, it will recommend electronic measures such as jamming or deception. The team may also recommend changes to the Corps EW plan. The team will have the capability to manipulate the EW Status Display as required.

Fire Power Target Teams

The number of teams may vary, depending on the size of the Division's area of interest, the volume of enemy activity detected, and the extent to which the Division Commander wishes to employ indirect fire to suppress it. The primary focus of these teams will be on Zone II, although they may concern themselves with targets in Zone I if such targets appear to have been unidentified by front line units. The mission of each team will be to identify enemy targets that may be inferred, by a correlation of real-time information with terrain information, and other immediately available information from the EWI data base. Once targets have been identified, the team will be responsible for recommending the targets for engagement by combat power and the appropriate weapons system. In the course of their work, the team will communicate directly with Division Artillery, the EW Target Team, the Tactical Air Control Party (TACP), or Division Aviation, as appropriate. They will have the ability to display the appropriate terrain in three dimensions, call upon the EWI data base for data relating to the same area, and replay portions of the Current Activity display as needed. They will also coordinate their work with the other Action teams as appropriate.

Aviation Operations Team

This team will communicate directly with organic and attached Aviation units, other cooperating units, the Air Defense organization, and the Air Traffic Management System (ATMS). It will monitor the

operations and status of the Aviation units, keep them informed of the current situation, and recommend Division instructions to them concerning future actions. It will also work with other action teams to arrange necessary combat support and coordination for aviation operations. The team will have the capability to manipulate the Current Activity display or call on EWI operations for special displays as required.

Brigade Operations Team

The number of these teams may vary with the number of attached units, but normally three teams should be able to monitor the activities of the Division's Brigades and other organic and attached ground units. These teams communicate directly with all subordinate and cooperating units and monitor the current status of friendly units. They will keep all units fully informed of the current situation as it pertains to them using initiative to "force feed" important information to subordinate units. They will work with other action teams to arrange necessary combat support and will recommend Division instructions to subordinate units concerning future sections. Each team will have the capability to manipulate the Current Activity and Current Situation Displays and call on EWI Operations for special displays as required.

Controllers

The Controller Category initially will be comprised of four controllers: EW & Deception, Fire Power, Reconnaissance, and Operations.

EW and Deception Controller

This officer will communicate directly with Division G-3 Operations, the DIVTAC, and the CTOC. He will monitor the current situation, confer with the Battle Coordinator and other Controllers, guide work of the EW Target Team, recommend changes to the Corps EW and Deception plans, and approve and issue instructions to subordinate units for the implementation of EW and Deception activities.

Fire Power Controller

This officer will communicate directly with Division G-3 Operations, the DIVTAC, and the CTOC. He will monitor the current situation, confer with the Battle Coordinator and Controllers, guide the work of the Fire Power Target Teams, monitor the status of weapons systems providing fire support to the Division, and approve the selection of targets and their allocation to a specific weapons system in accordance with the Division's responsibilities for Fire Support, Close Air Support, Interdiction, and Suppression of Enemy Air Defense.

Reconnaissance Controller

This officer will communicate directly with the Division EWI Operations Center, the EWI Mission Management Branch, the DIVTAC, and the CTOC. He will monitor the current situation and the development of plans for future operations, confer with the Battle Coordinator and other Controllers, and issue instructions and requirements for the collection of information from all sources to include the redeployment of sensor and information gathering systems. In issuing requirements he will coordinate with the EWI Operations Center to ensure that the needed information cannot be provided from data already available.

Operations Controller

This officer will monitor the current situation, confer with the Battle Coordinator and the other Controllers, guide the work of the Brigade and Aviation Operations teams and make recommendations to DIVTAC, or approve and issue instructions to subordinate units for the implementation of ground and Army Aviation operations as appropriate. In performing these duties he will communicate directly with the CTOC, the DIVTAC, and G-3 operations as required.

The Battle Coordinator

A personal representative of the Division Commander will act as the Battle Coordinator.

The selection will normally be a senior officer intimately familiar with the Division Commander's policies, such as the Chief of Staff, the G-3, the G-2 or the Deputy G-3.

The Battle Coordinator will communicate directly with the Division Commander, Commanders of subordinate units, the heads of the sections of the General Staff, and the CTOC. He will monitor the current situation and confer with the DIVTAC, the controllers, and the Planning coordinator concerning the conduct of the Battle and plans for future operations. He will make the decisions in accordance with the Commander's Policies to ensure that the Division executes its mission.

All-Source Intelligence

The next category of positions pertains to those which provide all-source intelligence support to the TOC. Most of this work will be done in the EWI Operations Center which will draw heavily on support from the Corps Fusion Center (The Corps EWI Operations Center). It should be noted that strenuous efforts have been made to make available to the TOC large amounts of information formerly compartmented and not available for general use in the TOC. There remains, however, a limited amount of information that cannot be sanitized or downgraded. This information must be available in such a way that it can be used while protecting essential security. This concept calls for the All-Source Intelligence support element of the EWI Operations Center to be in its own van, incorporated into the TOC so that the personnel can see the TOC displays and can communicate with appropriate members of the TOC staff when it is apparent that information in the van should be brought to bear on the current activities of the Division. The All-Source support personnel are also readily available to respond to questions raised by the Battle Coordinator, the Controllers, and the Planning teams. In addition, they provide a secure channel for the transmission of instructions and orders relating to some EW and Deception measures.

The numbers of people in the All-Source Support element may vary, depending on the volume of material needed and available, but the element should be prepared to provide support in all substantive areas in which the TOC is interested.

The Planning Coordinator

This officer will be responsible for recommending future operations to the Commander and for ensuring that planning for future operations is logically related to current operations and reflects the most up-to-date knowledge of current developments. He will supervise the work of the various planning teams and maintain direct communication with the DIVTAC, the G-3 plans Branch, and the EWI Operations Center. He will ensure that all Division plans are coordinated to fulfill the concept adopted by the Division Commander.

Planning Teams

The final category of positions in the TOC is that of the Planning Teams. Initially, there will be three planning teams:

Operations Planning Team

This team will be responsible for planning the next Division Operation in accordance with the Commander's concept. It will monitor the current situation and will communicate directly with the DIVTAC, the CTOC, the G-3 Plans Branch, and the EWI Operations Center. It will perform such planning and coordination as can be accomplished in the TOC and levy requirements for staff assistance on the G-3 Plans Branch as required. It will work directly with the other planning teams to ensure coordination with EW and Deception planning. The team will ensure that appropriate orders are issued for implementation of the plan.

Counterintelligence and Deception Planning Team

This team will monitor the current situation and the status of plans for the next opera-

tion. It will develop the Division's portion of the Corps plan designed to assist the next operation by preventing enemy intelligence from operating successfully and by deceiving the enemy concerning the Division's actual posture. These plans will cover both counter-intelligence and measures for creative deception of the enemy. The team will levy requirements on the EWI Operations Center, the DCAC, and the G-3 Plans Branch, as appropriate. The team will recommend appropriate orders to be issued for implementation of the plan and will keep up-to-date the Deception plans display in the TOC.

EW Planning Team

This team will monitor the current situation, the status of plans for the next operation, the Corps EW Plan, and the Corps Deception Plan. It will develop a Division EW plan that will help to implement both the EW and Deception Plans, and protect friendly forces from electronic weaponry to defeat the enemy. The EW Plan will also provide for the coordinated use of firepower against selected enemy electronic targets, especially those involved in enemy long range weapon systems and in enemy defense systems. The EW Planning Team will communicate directly with the DCAC Division Signal Units, the CTOC, the EWI Operations Center, and the G-3 Planning Branch. It will levy planning requirements on the DCAC and Division Signal Units as needed.

ALTERNATE TOC

During moves of the TOC and in emergency situations, the Assistant Division Commander or the Chief of Staff or an Assistant Chief of Staff will act as Battle Coordinator in an alternate TOC using the van-mounted displays belonging to the EWI Operations Center. Intelligence personnel will man the Action and Controller positions for EW, Fire Power, and Reconnaissance. Personnel from the G-3 Operations Branch will man the Action and Controller positions for Aviation and Brigade Operations. The operations planning function will not be represented in the Alternate TOC but will be carried on in the G-3 Plans Branch. The EW planning function will be carried on by the DCAC and the CI-Deception planning function will be carried on by EWI Operations.

The TOC displays will be updated automatically upon reactivation of the TOC.

DIVISION G-3 PLANS AND OPERATIONS

The main elements of the G-3 section of the Division staff will be located at some distance from the DTOC in order to reduce vulnerability and to make it easier to disguise the reconnaissance signature of the DTOC. The G-3 section will be linked to the DTOC by secure communications and the Division data distribution net. A duplicate of the DTOC Current Situation display will be repeated in the G-3 Section and G-3 will be responsible for the inputs to this display showing the location of friendly forces and unit boundaries.

THE DIVISION EWI OPERATION CENTER

Similar to the G-3 Section, the EWI Operations Center will be located at some distance from the DTOC, and will also be connected to the DTOC by secure communications and the Division data distribution system. In addition, the EWI Operations Center will be connected to the Corps EWI Center by secure communication and data links which permit it to query the Corps EWI data base and to ask for and receive ad hoc intelligence material and analyses as well as to respond to queries received from Corps. The Division EWI Operations Center will also have repeats of the DTOC Current Activity, EW, Enemy Air Defense, Order of Battle (OB), and Deception Plans displays. It will be responsible for monitoring the flow of information from human intelligence sources that are not formatted but which contain useful information that can be related to a specific location in the recent past.

The Center will be responsible for formatting such information and entering it in the appropriate DTOC display. The Center will also analyze current activity and current intelligence reports to synthesize data concerning the enemy situation and enter it in the Current Situation display to keep it constantly updated. It will also analyze the current enemy situation and report the extent to which it matches templates based on enemy doctrine. In addition, the Center will perform such OB or other analyses as may be required or levy a request on the Corps EWI Operations Center for assistance on these matters in order that the OB display may be kept upt-to-date and all intelligence problems related to current operations and planning may be solved.

DIVISION REAR

The G-1 and G-4 sections of the Division staff will be located at some distance to the rear of the DTOC but will be connected to the DTOC by secure communications and the Division data distribution system. The Division Rear will communicate directly with the DIVTAC, Brigades, and other Division units and with the various elements of the Division Support Command. The Division Rear will maintain the display in the TOC concerning the status of resources and provide other information required on an ad hoc basis.

APPENDIX A
ILLUSTRATION OF THE CONCEPT

To illustrate the dynamics of the command system concept outlined in this paper, the following discussion traces the history and effect of one sensor observation.

An emitter location system detects and locates a Gun Dish Radar within an elliptical error probability approximately 60 meters long and 20 meters wide. The location and classification of the radar are displayed within fractions of a second on the Current Activity Display and the EW Activity Display in the Division TOC and counterpart displays in the EWI Operations Center. Each display locates the Radar in analog fashion on a sketch map of the Division's area of interest. Within a few seconds, the entire Current Activity Display is repeated to the Corps TOC and the Corps EWI Operations Center.

In the Division TOC, the EW Action Officer notes that this Radar is associated with the Quad 23 mm anti-aircraft weapon and is of a type to be jammed in certain circumstances. He further notes that of the 30 or 40 similar reports on the display, this is the one of its type appearing in a new area and that there is no current requirement to jam Radars in that area. The EW Action Officer calls it to the attention of the Fire Power Action Officer who notes that the location is sufficiently accurate to permit artillery to fire at it as a target, that the Quad 23 mm is high on his Commander's list of preferred targets, and that it is within range of Division artillery. He, therefore, calls up the latest stereo photography covering that location and verifies that the elliptical error covers a small knoll from which a good field of fire could be obtained. He enters that location as an aiming point into the TACFIRE input device together with a priority rating. The Fire Power Controller releases the message to TACFIRE.

The Aviation Operations Action Officer notes that the Quad 23 mm is located near a route that he was planning to use for a helicopter operation within the next two hours. He asks the Fire Power Action Officer if it has been recommended as a target and asks the Reconnaissance Controller to confirm its destruction. Within 15 minutes of its detection, the Fire Power Action Officer verifies that it has been fired upon by Division Artillery. The Reconnaissance Controller requests that the Mission Management Branch in the EWI Operations Center direct a continued search of the Gun Dish frequency in the area and that a Remotely Piloted Vehicle (RPV) inspect the location for damage assessment or evidence of additional Anti-Aircraft (AA) deployment.

The Brigade Operations Action Officer and the Operations Controller note the presence of the radar and hear the discussion initiated by the Aviation Action Officer. The Battle Coordinator hears the discussions, notes the event, and directs the Reconnaissance Controller to pay special attention to the needs of the Aviation Action Officer for the next few hours until the helicopter operation has been completed.

In the EWI Operations Center, the Order of Battle Analysts note the presence of the Quad 23 mm in a new area. This, added to other information in their files and in the Corps EWI data base, convinces them that the 53rd Armored Infantry Bn. has moved to a

new location. Within 20 minutes of the detection of the Radar, their analysis has been approved by the Chief of Analysis and Production, and the changes showing the new location of the 53rd Armored Infantry Bn. have been entered into the Current Situation Display in the Division TOC. This new display is repeated to the Corps TOC and to the Division Forward CP (DIVTAC). The Division Commander notes the move by the enemy battalion and decides to amend the plan that involved the helicopter operation.

In the meantime, the Corps TOC has noted the presence of the Quad 23 mm in a new location and its engagement, and has received the Division's change to the Current Situation. The new Order of Battle information has been entered into the Corps EWI data base. The Corps Staff notes the move of the enemy battalion but does not feel that it requires any action by Corps.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